R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

RE: THE DRAWINGS

It is respectfully requested that the Examiner complete item 10 of the Office Action Summary sheet to confirm that the drawings filed with the application papers have been accepted.

RE: THE PRIORITY DOCUMENT

It is respectfully requested that the Examiner complete item 12 of the Office Action Summary sheet to confirm that a copy of the priority document has been received.

RE: THE SPECIFICATION

The specification has been amended to add an abstract on a separate page as required by the Examiner. In addition, the specification has been amended to add section headings, as well as to correct some minor informalities of which the undersigned has become aware. No new matter has been added, and it is respectfully requested that the amendments to the specification be approved and entered, and that the objection to the specification be withdrawn.

RE: THE CLAIMS

The claims have been amended only to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put them in better form for issuance in a U.S. patent. No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

RE: THE PRIOR ART REJECTION

Claims 1-4 were rejected under 35 USC 102 as being anticipated by USP 6,668,212 ("Colangelo"). This rejection, however, is respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in amended independent claim 1, a method is provided for tightening a screw joint to a desired target torque level using an impulse wrench having an impulse unit with a motor driven inertia drive member and a programmable control unit arranged to control a power supply to the impulse wrench. As recited in amended claim 1, the method comprises starting a screw joint tightening process at a reduced power supply to the impulse wrench, ascertaining an angular displacement and a retardation magnitude of the inertia drive member during each delivered impulse, calculating an instantaneous torque magnitude anda torque growth during a number

of delivered impulses, increasing after a very first delivered impulse the power supply to the impulse wrench in response to the calculated torque growth, reducing the power supply to the impulse wrench in response to the instantaneous torque magnitude and to the calculated torque growth during each impulse as the instantaneous torque magnitude reaches a predetermined percentage of the desired target torque level, and interrupting the power supply to the impulse wrench as the target torque level is reached.

Independent apparatus claim 3, moreover, recites a power wrench system which performs the above described method of the present invention.

It is respectfully submitted that Colangelo does not disclose, teach or suggest the features of the claimed present invention whereby the tightening process is started at reduced power supply and the power supply is increased after the very first delivered impulse, and whereby the power supply is reduced as an instantaneous torque magnitude reaches a predetermined percentage of a desired target torque level.

On the contrary, Colangelo discloses a tightening process which starts at a reduced maximum power “starting pressure,” then reduces after “a limited time” the power/pressure to an even lower “intermediate” level, and then ramps up the power supply/ pressure according to a rate retrieved from a preproduction

established table and suitable to the screw joint actually being tightened. See column 7, lines 52-63 of Colangelo.

It is respectfully pointed out that the “limited time” in Colangelo is not specified to the “very first delivered impulse,” in the manner of the claimed present invention. Instead, the “limited time” in Colangelo would be understood by one of ordinary skill in the art to include a number of impulses, and this means that if the screw joint being tightened happens to have a very stiff characteristic, the “limited time” could easily cause an over-tightening of the joint as a result of the first delivered impulses.

Instead of ramping up the power supply/ pressure during the tightening process as according to Colangelo, the claimed present invention reduces the power supply to the impulse wrench as the instantaneous torque magnitude reaches a predetermined percentage of the desired target torque level. As a result, the method and apparatus of the claimed present invention is universally applicable on different types and sizes of screw joints, because the power supply to the impulse wrench is first increased in response to the calculated torque growth and thereafter reduced in response to the instantaneous torque magnitude and the calculated torque growth during each impulse. That is, the power supply to the power wrench is controlled in response to the instantaneous magnitudes of the delivered torque,

i.e. parameter values experienced during the tightening process itself, and does not require any preproduction test running on different types of screw joints to get a table with suitable parameter values for individual types of screw joints.

By contrast, the method disclosed in Colangelo relies on a pre-production set up table with data to be used on different types of screw joints, and is not universally applicable on different types of screw joints.

Another significant difference between the claimed present invention and Colangelo (which is critical for a correct determination of the instantaneous torque magnitude), is that according to the claimed present invention an angle sensor is used in association with the inertia drive member of the impulse unit to ascertain the angular displacement and the retardation magnitude of the inertia drive member. Based on the angular displacement and the retardation magnitude of the inertia drive member, it is possible to calculate a correct impulse torque value. This means that it is possible to obtain a more accurate value of the delivered torque than by using an unreliable online torque transducer (which the Examiner erroneously refers to as a torque transducer for “an angle sensor via strain gage 109”) as disclosed in Colangelo.

In summary, it is respectfully submitted that Colangelo does not at all disclose, teach or suggest the claimed structural

features and advantageous effects of the method and apparatus of the present invention as recited in amended independent claims 1 and 3.

Accordingly, it is respectfully submitted that amended independent claims 1 and 3, and amended claims 2 and 4 respectively depending therefrom, all clearly patentably distinguish over Colangelo under 35 USC 102 as well as under 35 USC 103.

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In view of the foregoing, entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,

/Douglas Holtz/

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